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AN EVALUATION OF THE VISITS OF  
THE MOBILE FOUNDRY LABORATORY  
BY ORF AND CRIQ  
KANATA CONSULTING GROUP  
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MICROMEDIA

### EXECUTIVE SUMMARY

The Mobile Foundry Laboratory (MFL) was established in order to demonstrate the usefulness of modern foundry equipment and technology and to assist foundries across Canada to increase their productivity. CANMET had visited some 76 foundries with the MFL by the end of 1985 and a subsequent evaluation indicated that the program was highly successful.

In order to assess the merits of privatization, the MFL was loaned to the Association of Provincial Research Organizations (APRO). APRO obtained financial support from the Industrial Research Assistance Program (IRAP) administered by the National Research Council permitting the charges to the foundries to be minimized. APRO enlisted the aid of CRIQ and ORF to carry out visits to ten foundries in each of their respective provinces during 1986. CANMET assisted in the training of the crews from the two provincial research organizations both in Ottawa and in the field.

Overall, it was concluded that, by most measures, the service provided by CRIQ was as valuable as that provided by CANMET. The one difference was the average savings per visit which was \$82,000 for each CANMET visit in Quebec and \$45,000 for each CRIQ visit. In Ontario, some decrease in the value of the service was observed. This was in part due to the fact that the larger firms in Ontario did not rate the service provided by ORF highly and that some firms felt that the ORF service would have been more useful if more highly qualified staff in the metal processing field had been available. In summary, it would appear that the MFL service can be privatized without any long term deterioration in the quality of the service as long as care is taken to ensure that highly qualified and experienced personnel are used. This, in the case of ORF personnel, will likely require some additional training in foundry metal processing.

No objection was found to the \$500 fee charged for the ORF and CRIQ programs and in fact, firms appeared to be willing to pay a fee of \$1000-\$1500 if, at the same time, the length of the MFL visit could be increased.

In summary, the MFL service can be a highly effective government program whether it is delivered centrally or regionally. It is much appreciated by the foundry industry, in particular by the smaller firms in the business. If it is government policy to assist foundries to become more productive and competitive the MFL is clearly an important and valuable service to the industry.

## RÉSUMÉ

La création du Laboratoire mobile de fonderie (LMF) avait pour but de prouver l'utilité des installations et de la technologie modernes de fonderie et d'aider les fonderies du Canada à améliorer leur productivité. CANMET avait visité avec le LMF 76 fonderies à la fin de 1985 et l'évaluation qui en a suivi a permis de démontrer le grand succès de ce programme.

Dans le but d'évaluer les mérites de la privatisation, le LMF a été prêté à l'Association des organismes provinciaux de recherche qui a obtenu un appui financier dans le cadre du programme d'aide à la recherche industrielle administré par le Conseil national de recherches permettant ainsi l'allègement des frais pour les fonderies. Cette association a reçu l'aide du CRIQ et de l'ORF pour mener à bien les visites de 10 fonderies de chacune des deux provinces en 1986. De son côté, CANMET a participé à la formation du personnel des deux organismes de recherche provinciaux, tant à Ottawa que sur le terrain.

Dans l'ensemble, on a constaté que les services offerts par le CRIQ étaient aussi intéressants que ceux de CANMET. La seule différence se situait au niveau des économies moyennes par visite qui se sont montées à 82 000 \$ pour chaque visite de CANMET au Québec et 45 000 \$ pour chaque visite du CRIQ. En Ontario, on a constaté une certaine diminution de la valeur des services. Cela a été en partie dû au fait que les grandes entreprises de l'Ontario n'ont pas jugé que les services offerts par l'ORF étaient très intéressants et que certaines entreprises considéraient qu'ils auraient été plus utiles s'ils avaient été assurés par un personnel plus qualifié dans le domaine du traitement des métaux. En résumé, il a été constaté que les services du LMF pourraient être privatisés sans qu'il y ait détérioration à long terme de la qualité desdits services dans la mesure où le personnel intervenant dans ce processus serait hautement qualifié et expérimenté. En ce qui concerne le personnel de l'ORF, il serait nécessaire de lui fournir une formation supplémentaire dans le domaine du traitement des métaux en fonderie.

Les frais de 500 \$ encourus dans le cadre des programmes de l'ORF et du CRIQ n'ont fait l'objet d'aucune objection et les entreprises ont indiqué qu'elles étaient prêtes à payer des frais de 1 000 à 1 500 \$ si les visites du LMF pouvaient être allongées.

En résumé, les services du LMF peuvent faire l'objet d'un programme gouvernemental très efficace, qu'il soit assumé de façon centrale ou à la dimension régionale. Les fonderies, en particulier les plus petites, semblent apprécier vivement ce genre de service. Si le gouvernement a l'intention d'aider les fonderies à améliorer leur productivité et leur compétitivité, il est clair que le LMF pourrait rendre des services intéressants et importants à l'industrie.

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## 1. INTRODUCTION

The Mobile Foundry Laboratory (MFL) was conceived by CANMET as a means of demonstrating, on foundry premises, the use of modern technology to increase productivity and improve quality control in Canadian foundries. The basic premise underlying the concept is that technology transfer is maximized when the recipient can see techniques applied on his own premises, and to his own operations rather than being exposed to ideas in government laboratories or through seminars. The MFL, which is furnished with test equipment capable of carrying out evaluations of sand and metal processing practices, is transported directly to a company's premises so that on site assessments and comparisons can be made immediately. Following these evaluations and assessments made by the visiting foundry specialists during a two day visit, a confidential report, containing a detailed analysis of production processes and a comprehensive set of recommendations to improve product quality and plant productivity, is provided to the firm.

In 1984 and 1985, CANMET personnel visited some 52 (to the end of March, 1985) foundries across Canada with the MFL. Some months after these visits were completed, a comprehensive evaluation was carried out to identify and quantify the direct and indirect economic and technological benefits generated by the program. The results of this evaluation are contained in the CANMET report under DSS File No. 09GR.23490-5-9153.

In order to assess the merits of privatization, the MFL was loaned to the Association of Provincial Research Organizations (APRO). APRO obtained financial support from the Industrial Research Association Program (IRAP) administered by the National Research Council permitting the charges to the foundries to be minimized. APRO enlisted the aid of CRIQ and ORF to carry out visits to ten foundries in each of their respective provinces during 1986. CANMET assisted in the training of the crews from the two provincial research organizations both in Ottawa and in the field.

The purpose of the current evaluation was to identify and quantify the technological and economic benefits generated by the MFL services service to the 20 foundries visited by the two provincial research organizations. In addition, the benefits resulting from the privatized MFL service are compared to those from the original CANMET service.

## 2. METHODOLOGY

Preparatory to carrying out the evaluation of the regionalized MFL service, letters were sent out by the CANMET Foundry Section to all 20 firms to announce the study and its purpose and to seek their cooperation in the project. The Kanata Consulting Group then telephoned each firm to schedule an interview. An advance copy of the interview guide was mailed to each contact person so that he could reflect on the subject matter prior to the meeting. Subsequently, in-depth interviews were held with foundry personnel

for each company.(1)

During these interviews, foundry personnel were asked to comment on each recommendation contained in the report received by each foundry after the MFL visit. The purpose was to determine whether or not they agreed with the recommendation and whether or not they had, or were planning to, implement it. In addition, the firms were asked to provide an overall assessment of the usefulness of the MFL visit in four areas of technology.

The companies were also requested to estimate the actual and expected economic savings derived from the visit, and a variety of other tangible benefits, such as the hiring or training of additional personnel and the purchase of advanced equipment were explored.

Finally, opinions were solicited on the overall usefulness of each visit and suggestions sought for improving the service provided by the MFL and related staff of ORF and CRIQ.

### 3. RESULTS

The overall results are reported under the following headings:

#### 3.1 CHARACTERISITCS OF THE COMPANIES VISITED

#### 3.2 ECONOMIC BENEFITS

#### 3.3 IMPLEMENTATION OF THE RECOMMENDATIONS

#### 3.4 TECHNOLOGICAL BENEFITS

#### 3.5 OTHER BENEFITS

#### 3.6 OVERALL IMPRESSIONS OF THE MFL SERVICE

Appendices 1 and 2 comprise detailed information on the results for Ontario and Quebec. The reader interested in such data and the opinions of clients by province should examine these Appendices.

#### 3.1 CHARACTERISTICS OF THE COMPANIES VISITED

Nineteen foundries were interviewed in the two provinces (10 in Quebec and 9 in Ontario). The companies ranged in size from 14 to 250 employees and in total employed 1455 people. Employment levels by province for these firms are shown in TABLE 1 below.

- (1) One firm in Ontario was not visited because the relevant personnel had left the firm in the period between the MFL visit and the evaluation.

TABLE 1  
PROVINCIAL FOUNDRY CHARACTERISTICS

| <u>Province</u> | <u># Foundries<br/>Interviewed</u> | <u># Employees</u> | <u>Average Number of<br/>Employees/Foundry</u> |
|-----------------|------------------------------------|--------------------|------------------------------------------------|
| Quebec          | 10                                 | 450                | 45                                             |
| Ontario         | <u>9</u>                           | <u>1005</u>        | <u>112</u>                                     |
| Total           | 19                                 | 1455               | 76.5                                           |

Groupings of the foundries by size, the number of professional and technically trained personnel and the number of persons employed in quality control are shown in TABLE II below.

TABLE II  
SIZE CHARACTERISTICS

| <u># Employees</u> | <u># Foundries<br/>Interviewed</u> | <u>Professional<br/>&amp; Technical<br/>Employees</u> | <u>Employees in<br/>Quality Control</u> | <u>Average # of<br/>Professionals<br/>Per Firm</u> |
|--------------------|------------------------------------|-------------------------------------------------------|-----------------------------------------|----------------------------------------------------|
| 10 - 19            | 3                                  | 5                                                     | 2                                       | 1.7                                                |
| 20 - 49            | 7                                  | 17                                                    | 13                                      | 2.4                                                |
| 50 - 100           | 4                                  | 22                                                    | 9                                       | 5.4                                                |
| 100 - 150          | 3                                  | 12                                                    | 11                                      | 4.0                                                |
| 150 - 250          | <u>2</u>                           | <u>16</u>                                             | <u>18</u>                               | <u>8.0</u>                                         |
| Total              | 19                                 | 72                                                    | 53                                      | 3.8                                                |

The nineteen foundries employed a total of 72 professional and technically trained personnel and only one firm did not employ a professional or technically trained person. All foundries but one were wholly Canadian owned. Annual sales ranged from \$850 thousand to \$35 million and totalled \$143 million for all firms. Exports totalled \$22 million.

### 3.2 ECONOMIC BENEFITS

Each foundry was asked to estimate the savings they expected through implementation of the recommendations in their MFL report. Estimates were requested for actual savings realized to date and for those that might accrue over the next five years.

The visits in Quebec began in April, continued in May and June and were completed in August. In Ontario, the first visits took

place in September, continued in October and were completed in December. The foundries generally did not receive the reports containing the detailed recommendations until at least a month after the visit. Consequently, the foundries in Ontario particularly had little time to implement the recommendations and to realize actual savings. However, one firm estimated actual savings of \$11,000 and expected savings of some \$155,000 over five years, and four others expected to realize cost savings of \$150,000 over a 1-3 year period. The other four companies were of the opinion that they would not realize any cost savings, although the majority of these felt the visit had been useful to them. TABLE III below summarizes the actual and expected savings.

TABLE III  
ESTIMATED SAVINGS IN ONTARIO (\$000) (1)

| <u>Actual</u> | <u>Estimated Savings<br/>5 Years</u> | <u>Total</u> | <u>Average Savings<br/>Per Visit (9 Visits)</u> |
|---------------|--------------------------------------|--------------|-------------------------------------------------|
| 11            | 305                                  | 316          | 35                                              |

(1) Only one foundry in Ontario was able to provide breakdowns by the Metal and Sand categories so only the total savings are shown.

Foundries in Quebec had more time to assess the actual dollar savings they had achieved and expected to achieve through implementation of the MFL/CRIQ recommendations. Their estimates are summarized in TABLE IV below.

TABLE IV  
ESTIMATED SAVINGS IN QUEBEC (\$000)

| <u>Category</u>  | <u>Estimated Savings<br/>Actual</u> | <u>5 Years</u> | <u>Total</u> | <u>Av. Savings Per<br/>Visit (10 Visits)</u> |
|------------------|-------------------------------------|----------------|--------------|----------------------------------------------|
| Metal Processing | 58                                  | 263            | 321          | 32                                           |
| Sand Treatment   | 13                                  | 115            | 128          | 13                                           |
| Total            | 71                                  | 378            | 449          | 45                                           |

### 3.2.1 COMPARISONS WITH THE SAVINGS FROM CANMET VISITS (\$000)

TABLE V

|                | # Foundries   |             | Total Savings |             | Savings Per Visit |             |
|----------------|---------------|-------------|---------------|-------------|-------------------|-------------|
|                | <u>CANMET</u> | <u>ORF</u>  | <u>CANMET</u> | <u>ORF</u>  | <u>CANMET</u>     | <u>ORF</u>  |
| <u>Ontario</u> |               |             |               |             |                   |             |
| Large (1)      | 7             | 6           | 2187          | 216         | 312               | 52          |
| Small          | 6             | 3           | 1080          | 100         | 180               | 21          |
|                | <u>CANMET</u> | <u>CRIQ</u> | <u>CANMET</u> | <u>CRIQ</u> | <u>CANMET</u>     | <u>CRIQ</u> |
| <u>Quebec</u>  |               |             |               |             |                   |             |
| Large          | 2             | 3           | 0             | 155         | 0                 | 52          |
| Small          | 7             | 7           | 576           | 294         | 82                | 42          |

- (1) Large firms are those which employ more than 50 persons, small firms fewer than 50 persons.

Average savings following the CANMET visits were significantly higher for both size categories in Ontario. In Quebec the CANMET visits did not result in savings for the two large companies as fruitful visits did not take place for various reasons. CANMET savings from visits to small firms were, on the average, twice those reported from the CRIQ visits.

### 3.3 IMPLEMENTATION OF THE RECOMMENDATIONS

In the detailed reports provided to firms after the MFL visits, recommendations were made covering two separate categories of foundry operations. The first such category is metal processing which includes such factors as heating, pouring and composition. The second category is sand treatment which includes quantity and quality blending and testing procedures.

TABLE IV below provides a summary of the number of recommendations made to firms covered by this study and of the action firms had taken or planned to take on these recommendations.

TABLE VI

|                         | # Recs    | Fully or Partially Implemented | Recs Planned   | Recs Disagreed With | Recs Being Considered | Too Costly   |
|-------------------------|-----------|--------------------------------|----------------|---------------------|-----------------------|--------------|
| <u>Metal Processing</u> |           |                                |                |                     |                       |              |
| Ontario                 | 107       | 43(40%)                        | 9(8%)          | 26(24%)             | 24(22%)               | 5(5%)        |
| Quebec                  | <u>72</u> | <u>43(60%)</u>                 | <u>11(15%)</u> | <u>18(25%)</u>      | <u>0</u>              | <u>0</u>     |
| Total                   | 179       | 86(48%)                        | 20(11%)        | 44(24.5%)           | 24(13.5%)             | 5(3%)        |
| <u>Sand Treatment</u>   |           |                                |                |                     |                       |              |
| Ontario                 | 81        | 40(49%)                        | 10(12%)        | 11(14%)             | 17(21%)               | 3(4%)        |
| Quebec                  | <u>49</u> | <u>25(51%)</u>                 | <u>15(31%)</u> | <u>7(14%)</u>       | <u>1(2%)</u>          | <u>1(2%)</u> |
| Total                   | 130       | 65(50%)                        | 25(19%)        | 18(14%)             | 18(14%)               | 4(3%)        |

In the Metal Processing category 59% of the 179 recommendations had either been fully or partially implemented or were planned, while an additional 13.5% were being considered. Forty-four (24.5%) of the recommendations were disagreed with and five (3%) were considered too costly to implement.

In the Sand category, 69% of the 130 recommendations had either been fully or partially implemented or were being planned, while another 18 (14%) were being considered. eighteen (14%) were disagreed with and 4 (3%) were considered too costly.

### 3.3.1 COMPARISON WITH THE IMPLEMENTATION RATES FROM CANMET VISITS

TABLE VII

#### ACTION TAKEN ON RECOMMENDATIONS

ONTARIO - (All figures are percentages)

|                         | Fully or Partially Implemented |    | Planned          |    | Disagreed With   |    | Being Considered |    | Too Costly       |   |
|-------------------------|--------------------------------|----|------------------|----|------------------|----|------------------|----|------------------|---|
| <u>Metal Processing</u> | <u>CAN - ORF</u>               |    | <u>CAN - ORF</u> |    | <u>CAN - ORF</u> |    | <u>CAN - ORF</u> |    | <u>CAN - ORF</u> |   |
|                         | 68                             | 40 | 8                | 9  | 15               | 24 | 8                | 23 | 1                | 5 |
| <u>Sand</u>             | 57                             | 49 | 4                | 12 | 16               | 14 | 14               | 21 | 10               | 4 |

In the metal processing category 76% of CANMET's recommendations were implemented or planned, compared to 49% of ORF's recommendations. In the sand category, not surprisingly because the same consultant was employed, 61% of the CANMET

recommendations and 61% of ORF recommendations were either implemented or planned.

TABLE VIII

QUEBEC - (All figures are percentages)

|                             | Fully or<br>Partially<br>Implemented | Planned  | Disagreed<br>With | Being<br>Considered | Too<br>Costly |
|-----------------------------|--------------------------------------|----------|-------------------|---------------------|---------------|
|                             | CAN-CRIQ                             | CAN-CRIQ | CAN-CRIQ          | CAN-CRIQ            | CAN-CRIQ      |
| <u>Metal<br/>Processing</u> | 53 60                                | 6 15     | 25 25             | 15 0                | 1 0           |
| <u>Sand</u>                 | 53 51                                | 7 31     | 29 14             | 10 2                | 0 2           |

In the metal processing category 75% of CRIQ's recommendations were either implemented or planned, compared to 59% of CANMET's. In the sand category, 60% of CANMET's recommendations were either implemented or planned compared to 82% of CRIQ's recommendations.

In general, the percentage of recommendations accepted by the foundries in Quebec was higher for CRIQ than for CANMET. In Ontario however, in the metal processing category, the acceptance level for ORF recommendations was considerably lower (78% compared to 48%) than that of CANMET.

### 3.4 TECHNOLOGICAL BENEFITS

Technological benefits accruing to the firms, as result of the MFL visit, were investigated using the four categories of foundry activity listed below.

- Moulding methods and sand control.
- Metal preparation and quality control.
- Defect analysis.
- Use of computers in process control.

Technological benefits were assessed by asking each foundry to rate the usefulness of the visit in three aspects of the above categories. The aspects as rated were:

- New ideas transmitted.
- Assistance provided in solving technical problems.
- Value of the recommendations.

Benefits received in each of the three aspects of the four categories were estimated on a scale of 1 to 5, with 1 representing a very low level of benefits and 5 a very high level. The results are shown in TABLE V below, while more detailed results for each province are given Appendices 1 and 2.

TABLE IX

| Technical Categories                  | New Knowledge Concepts or Ideas |     | Assistance in Solving Technical Problems |     | Recs to Improve Processes |     | Overall Average |
|---------------------------------------|---------------------------------|-----|------------------------------------------|-----|---------------------------|-----|-----------------|
|                                       | Range-Average                   |     | Range-Average                            |     | Range-Average             |     |                 |
| (1) Moulding Methods and Sand Control | 1-4                             | 2.3 | 1-5                                      | 2.5 | 1-5                       | 3.0 | 2.6(2.9)        |
| Metal Preparation & Quality Control   | 1-4                             | 1.9 | 1-4                                      | 1.9 | 1-5                       | 2.9 | 2.2(2.9)        |
| Defect Analysis                       | 2-4                             | 2.6 | 2-4                                      | 2.9 | 3-5                       | 3.6 | 3.0(2.7)        |
| Use of Computers in Process Control   | 1                               | 1.  | 1                                        | 1.  | 2                         | 2.  | 1.33(3.2)       |

(1) Figures in brackets are the results from the CANMET visits.

Only seven firms attempted an assessment in the field of defect analysis and only one in the area of computers and process control. Therefore, it is clear that not much emphasis was given to these categories by the MFL teams and that not much weight should be given the results in TABLE VIII under these headings.

All firms visited provided an assessment in the sand treatment and metal processing fields and it is clear that the advice they received in the sand treatment area was viewed as being the most useful of the two categories.

#### OTHER BENEFITS

The following other benefits were identified by the firms:

- Eleven foundries had or were arranging for training sessions for a total of 60 employees.
- Three firms had hired five professional and technical staff.
- Ten firms had purchased or intended to purchase new production or test equipment.
- Four companies expected to achieve increased sales but could not quantify these.

In general, the foundries felt that their product quality and their ability to make existing products would improve as a result of the MFL visit but they did not expect to achieve increased sales or to hire additional staff as a result of the MFL recommendations.

### 3.6 OVERALL IMPRESSIONS

The economic and technical benefits arising from the MFL visits were evaluated in some detail through the interviews with clients in this study. Following these rather detailed assessments, each foundry was asked for its overall impression of the usefulness of the program. TABLE VI below summarizes the overall results.

TABLE X

|                  | <u>No. of Firms</u> |
|------------------|---------------------|
| Not Useful       | 2                   |
| Somewhat Useful  | 1                   |
| Useful           | 8                   |
| Very Useful      | 3                   |
| Extremely Useful | 5                   |

#### 3.6.1 COMPARISON OF THE OVERALL IMPRESSIONS OF THE SERVICE PROVIDED BY CANMET, ORF AND CRIQ

TABLE XI

#### PERCENTAGE OF FIRMS

|                  | <u>ONTARIO</u>      |    | <u>QUEBEC</u>        |    |
|------------------|---------------------|----|----------------------|----|
|                  | <u>CANMET - ORF</u> |    | <u>CANMET - CRIQ</u> |    |
| Not Useful       | 0                   | 22 | 0                    | 0  |
| Somewhat Useful  | 0                   | 11 | 0                    | 9  |
| Useful           | 15                  | 44 | 22                   | 36 |
| Very Useful      | 54                  | 11 | 67                   | 18 |
| Extremely Useful | 31                  | 11 | 11                   | 36 |

In Ontario, all firms rated the CANMET service provided as useful or better, and 85% rated it very useful or extremely useful. The companies in Ontario visited by CANMET included seven large foundries with more than 50 employees. Sixty-six percent of the firms visited by ORF rated the service as useful or better and 22% as very or extremely useful. However, of the six large foundries, two rated the visit as not useful, one as somewhat useful and three as useful. The three small firms in the sample all rated the ORF service as useful or better.

In Quebec, the results of the CANMET visits were similar to those in Ontario. The service provided by CRIQ was rated as useful

or better by 90% of the clients and 54% felt it was very or extremely useful. One foundry rated the metal aspects of the visits somewhat useful and the sand analysis as extremely useful.

#### 4. COMMENTS AND DISCUSSION

Many of the foundries that found the visit useful thought they should be extended to 3-5 days and that they should be repeated every 1-2 years. One firm thought that the effectiveness of the visit would be increased if the MFL staff could spend about 2 days familiarizing themselves with a firm's practices and products before the actual evaluation. While general satisfaction was expressed with the advice received in the area of sand treatment, it was felt in some instances that the service would have gained from the use of better qualified and/or more experienced staff in the metal processing area, particularly in non-ferrous metals. It appears that in order to assist large firms a higher level of knowledge of the foundry industry in the metal processing field is needed than for small foundries.

There were no complaints about the \$500 fee charged for the service and in fact, most firms expressed a willingness to pay considerably more (\$1000 - \$2000), particularly if the service was provided on an annual basis or upon demand.

More complete lists of the suggestions made by client firms are in the provincial summaries contained in Appendices 1 and 2.

#### 5. CONCLUSIONS

In order to assess the value of privatizing the Mobile Foundry Laboratory Program, the MFL was loaned to the Ontario Research Foundation and the Centre de Recherche Industrielle du Quebec for four months in 1986. Staff of these organizations visited ten firms in each province during this period and, based on information supplied by these foundries during this evaluation, it appears that:

- Many firms, with the exception of some of the larger ones in Ontario, were enthusiastic about the usefulness of the service.
- In Ontario, some 48 percent of the metal processing recommendations and 61 percent of the sand treatment recommendations had been adopted or were planned, whereas the corresponding percentages for Quebec were 75 and 82 percent respectively.
- While the quantity and quality of the data obtained on financial savings during this evaluation do not justify a cost effectiveness analysis, it is clear that the realized and expected economic benefits are considerably lower than those reported in the evaluation of the CANMET visits. This is particularly true in the metal processing area in Ontario.
- Other benefits resulting from the service such as new hiring, extra training, purchase of new equipment and increased sales appear to be generally the same for both the CANMET and

provincial programs.

- In Ontario, a significantly lower percentage of the ORF recommendations in the Metal Processing field was accepted than the CANMET recommendations.
- In general, the larger firms in Ontario did not find the service too useful.
- The CRIQ service appeared to be generally well received, both in absolute terms and also compared to the CANMET service in Quebec.
- While several firms in Ontario greatly appreciated the ORF MFL service, it is clear that the service could be improved through the use of more experienced and perhaps better trained staff in the metal processing field.
- It is evident, based on the current evaluation, that regionalization of the MFL service in Ontario and Quebec was relatively successful and in some categories the service was regarded as productive as the CANMET service. The one proviso is that the MFL should be staffed by the most highly qualified people possible.
- In Ontario, this evaluation was somewhat premature as insufficient time had elapsed between the MFL and the consultants visits to firms.

#### 6. RECOMMENDATIONS

1. If it is decided to continue privatizing the MFL service, care must be taken to ensure that it is staffed by the highest quality staff possible, particularly in the metal processing field.
2. It is recommended that ORF avail themselves of the expertise in CANMET by arranging for further training in the metal processing aspects of foundry work including non-ferrous metal processing.
3. Service to smaller firms should be emphasized.
4. Fees for the service could be increased to \$1000 - \$1500 without decreasing client interest.
5. An evaluation of the costs and benefits of extending MFL visits to firms to 3 - 5 days as well as having the MFL staff spend a day or two with the firm before the evaluation, in order to familiarize themselves with the firms processes, products and customers, should be carried out.
6. A sample (approximately 15) of foundries in the current sample, or in the original CANMET sample, should be revisited by the MFL about one and one half years after their first visit

and the benefits from such a second visit evaluated.

7. A determined effort should be made by organizations delivering the MFL service to get their written reports to clients as soon as possible after the visit.

8. A period of six months, after the reports have been received by the foundries, should be allowed before an evaluation is carried out on the results of the MFL visits.

ONTARIO1.1 CHARACTERISTICS OF THE COMPANIES

Nine foundries were visited for interviews in Ontario, the smallest of which employed 17 persons, the largest 250. From company to company, operations ranged from high volume, single alloy, permanent mould processes to low volume custom made castings in a variety of metals. TABLE I below summarizes company characteristics by number of employees, number of professional and technically trained personnel and the number employed in quality control.

TABLE I

| <u>Size Category</u><br><u># Employees)</u> | <u># Foundries</u> | <u>Professional</u><br><u>&amp; Technical</u><br><u>Employees</u> | <u>Employees</u><br><u>in Quality</u><br><u>Control</u> |
|---------------------------------------------|--------------------|-------------------------------------------------------------------|---------------------------------------------------------|
| 17 - 50                                     | 3                  | 1, 2, 2                                                           | 1, 1, 0                                                 |
| 50 - 100                                    | 2                  | 8, 5                                                              | 2.5, 2                                                  |
| 100 - 250                                   | <u>4</u>           | <u>10, 6, 3, 2</u>                                                | <u>11, 7, 5, 2</u>                                      |
| Total                                       | 9                  | 39                                                                | 31.5                                                    |

Annual sales for 1986 ranged from \$1 million to \$35 million with exports ranging from 0% to 100% of total sales.

1.2 IMPLEMENTATION OF RECOMMENDATIONS

Specific recommendations to improve quality and productivity were made in the ORF report to firms in both the metal processing and the sand treatment areas of foundry operations. TABLE II below summarizes the action taken on these recommendations by the nine foundries in Ontario.

TABLE II

|                         |   | Number of<br>Recs | Fully or<br>Partially<br>Implemented | Planned   | Being<br>Considered | Disagreed<br>With | Too<br>Costly |
|-------------------------|---|-------------------|--------------------------------------|-----------|---------------------|-------------------|---------------|
| <u>Metal Processing</u> |   |                   |                                      |           |                     |                   |               |
| Company                 | 1 | 20*               | 2                                    | 4         | 13                  | 1                 | -             |
|                         | 2 | 12                | 6                                    | 3         | 2                   | 1                 | -             |
|                         | 3 | 5                 | 3                                    | -         | 1                   | 1                 | -             |
|                         | 4 | 8                 | 4                                    | -         | -                   | 3                 | 1             |
|                         | 5 | 4                 | 2                                    | -         | 1                   | 1                 | -             |
|                         | 6 | 15                | 3                                    | 1         | 1                   | 10                | -             |
|                         | 7 | 27                | 14                                   | -         | 4                   | 5                 | 4             |
|                         | 8 | 11                | 6                                    | -         | 1                   | 4                 | -             |
|                         | 9 | <u>5</u>          | <u>3</u>                             | <u>1</u>  | <u>1</u>            | <u>-</u>          | <u>-</u>      |
| Total                   |   | 107               | 43 (40%)                             | 9(8.5%)   | 24(22.5%)           | 26(24%)           | 5(5%)         |
| <u>Sand</u>             |   |                   |                                      |           |                     |                   |               |
| Company                 | 1 | 13*               | 4                                    | 3         | 5                   | 1                 | 0             |
|                         | 2 | 17                | 14                                   | -         | -                   | 3                 | -             |
|                         | 3 | 11                | 4                                    | 4         | 1                   | 2                 | -             |
|                         | 4 | 12                | 8                                    | 2         | 2                   | -                 | -             |
|                         | 5 | 6                 | 2                                    | -         | 2                   | 2                 | -             |
|                         | 6 | 6                 | -                                    | -         | -                   | -                 | -             |
|                         | 7 | 9                 | 3                                    | -         | 3                   | -                 | 3             |
|                         | 8 | 10                | 4                                    | 1         | 2                   | 3                 | -             |
|                         | 9 | <u>3</u>          | <u>1</u>                             | <u>-</u>  | <u>2</u>            | <u>-</u>          | <u>-</u>      |
| Total                   |   | 81                | 40(50%)                              | 10(12.5%) | 17(21%)             | 11(13.5%)         | 3(3%)         |

\* Company had just received ORF report a few days prior to the interview and had not had time to fully consider all the recommendations.

It can be seen that in the metal processing category 48.5 % of the recommendations had either been implemented or plans for implementation were underway, while 62.5% of the recommendations relating to sand treatment had been adopted or were being planned. It should perhaps be pointed out that the firms felt they were already employing, to the best of their ability, the practices suggested in 18 (17%) of the recommendations relating to metal processing, and in 7 (9.5%) of those relating to sand treatment.

### 1.3 TECHNOLOGICAL BENEFITS

The foundries assessed the level of technological usefulness of the MFL visits on a 1 to 5 scale with 1 representing a low level and 5 a high level. The results are shown in TABLE III below.

TABLE III

| Technical Categories                 | New Knowledge Concepts or Ideas |     | Assistance in Technical Problems |     | Recs to Improve Processes |      | Overall Average |
|--------------------------------------|---------------------------------|-----|----------------------------------|-----|---------------------------|------|-----------------|
|                                      | <u>Range-Average</u>            |     | <u>Range-Average</u>             |     | <u>Range-Average</u>      |      |                 |
| Moulding Methods & Sand Control      | 1 - 4                           | 2.1 | 1 - 4                            | 2.1 | 1 - 5                     | 3.1  | 2.45            |
| Metal Preparation & Quality Control  | 1 - 2                           | 1.5 | 1 - 3                            | 1.5 | 1 - 3                     | 2.55 | 1.84            |
| Defect Analysis*                     | 2                               | 2.0 | 1 - 3                            | 2.5 | 3                         | 3.0  | 2.5             |
| Use of Computers in Process Control* | 1                               | 1.0 | 1                                | 1.0 | 2                         | 2.0  | 1.33            |

\* Only two firms attempted any assessment in the fields of defect analysis and only one in the area of computers and process control. Therefore, it is clear that not much emphasis was given to these two fields during MFL visits and not much weight should be given to the results shown in TABLE III under these headings.

All firms provided an assessment in the metal processing and sand control fields and it is clear that they felt the assistance provided with sand treatment and control was the most useful technically.

## 1.4 ECONOMIC AND OTHER BENEFITS

### 1.4.1 ECONOMIC SAVINGS

Perhaps because the consultants interviews took place so soon after the companies had received their ORF reports, and consequently firms had not been able to fully implement the recommendations, only one firm was able to provide estimates of cost savings which had already been realized. In this instance \$11,000 had been realized and \$155,000 was expected over the next five years as a result of implementing the recommendations of the ORF report.

Four firms predicted that they would achieve cost savings of \$150,000 over a 1 - 3 year period but could not attribute these savings to a particular phase of their operations such as metal processing or sand treatment.

The other four firms felt that they would not realize any cost savings from the MFL visit though the majority of these felt that the visit had been somewhat useful to them. These firms tended to be the larger more technically sophisticated ones.

### 1.4.2 OTHER BENEFITS

All of the foundries interviewed employed professional or technically trained staff as well as quality control people. However, as a result of the ORF visit, four companies had arranged training sessions for nine employees and one company had hired two professional staff. Four companies had purchased new production or test equipment.

None of the companies could predict any significant impact on increased sales, additional hiring, retention of existing jobs or markets though there was some recognition that their ability to make existing products would improve as a result of implementing the ORF recommendations.

## 1.5 OVERALL IMPRESSIONS

The companies rated the overall usefulness of the ORF/MFL visit on a scale ranging from "not useful" to "extremely useful". The results are given in TABLE IV below.

TABLE IV

|                  |   |
|------------------|---|
| Not Useful       | 2 |
| Somewhat Useful  | 1 |
| Useful           | 4 |
| Very Useful      | 1 |
| Extremely Useful | 1 |

However, all companies but two felt they had obtained good value for the \$500 each visit cost.

#### 1.6 SUGGESTIONS

Each foundry interviewed was asked for suggestions as to how the MFL service could be improved. The following comments were provided:

- Four companies felt they would have gained more from a longer visit, say 3 to 5 days.
- Five firms expressed interest in having repeat visits, generally every two years, but in one case a follow-up in six months was felt desirable.
- Larger, more technically sophisticated firms already have well established contact with CANMET and universities. It might be better if the ORF/MFL activity was to concentrate on the smaller foundries.
- Five firms felt that the MFL staff should spend about two days familiarizing themselves with the firms operations, products and clients before their evaluation as this would result in their final recommendations being more practical and relevant.
- While general satisfaction was expressed with advice received in the sand treatment area, it was felt, in three instances, that the service would have benefitted from staff more knowledgeable in the foundry industry in the metal processing field, particularly in non-ferrous metals.
- One firm suggested that it would be useful if the MFL staff could publish a generalized summary of their findings based on the visits.

#### 1.7 COMPARISON OF THE CANMET AND ORF/MFL SERVICE

##### 1.7.1 IMPLEMENTATION OF RECOMMENDATIONS

TABLE V below compares the degree of implementation by firms of all of the recommendations contained in the reports provided by CANMET and ORF after their visits to Ontario firms in 1984/85 and 1986 respectively.

TABLE V

|                         | Total No.<br>of Recs | Fully or<br>Partially<br>Implemented | Planned   | Being<br>Considered | Disagreed<br>With | Too<br>Costly |
|-------------------------|----------------------|--------------------------------------|-----------|---------------------|-------------------|---------------|
| <u>Metal Processing</u> |                      |                                      |           |                     |                   |               |
| CANMET (13 Co.)         | 87                   | 59(68%)                              | 7(8%)     | 7(8%)               | 13(15%)           | 1(1%)         |
| ORF (9 Co.)             | 107                  | 43(40%)                              | 9(8.5%)   | 24(22.5%)           | 26(24%)           | 5(5%)         |
| <u>Sand Treatment</u>   |                      |                                      |           |                     |                   |               |
| CANMET (13 Co.)         | 116                  | 66(57%)                              | 5(4.3%)   | 18(15.5%)           | 16(13.8%)         | 11(9.5%)      |
| ORF (9 Co.)             | 81                   | 40(50%)                              | 10(12.5%) | 17(21%)             | 11(13.5%)         | 3(3%)         |

It will be observed that the results are basically the same in the Sand Treatment category, While in Metal Processing, 76% of the CANMET recommendations had been implemented or were planned while the corresponding figure was 48.5% for those of ORF. In addition, for the same category, 15% of CANMET's recommendations were disagreed with compared with 24% of ORF's. These results may reflect, to a degree, the fact that the elapsed time between receipt of reports by firms and the consultant's interviews was shorter in the case of the ORF program than for the CANMET service. It should further be noted that the samples of firms studied may not be completely comparable because the firms visited by the ORF included three or four large firms which did not find the service too useful.

#### 1.7.2 TECHNOLOGICAL BENEFITS

TABLE VI below gives a comparison of the overall average rating by firms of the technological usefulness of the MFL study based on individual ratings of usefulness in the three areas of transfer of new knowledge, assistance with technical problems and recommendations to improve processes for the CANMET and ORF services.

TABLE VI

| <u>Technical Categories</u>              | <u>CANMET</u> | <u>ORF</u> |
|------------------------------------------|---------------|------------|
| Moulding Methods<br>and Sand Control     | 2.8           | 2.45       |
| Metal Preparation<br>and Quality Control | 2.7           | 1.84       |

There were not enough responses in the current evaluation in the defect analysis and computer control categories to permit valid comparisons with the original evaluation of the CANMET service. It will be observed that, in the category of metal preparation, it was felt that the ORF service provided somewhat fewer benefits than the CANMET service, though if one eliminates the three largest companies from the ORF sample, the overall rating increases from 1.84 to 2.2.

### 1.7.3 ECONOMIC BENEFITS

TABLE VII following, compares the economic benefits realized or expected by the firms in Ontario dealt with by ORF and CANMET.

TABLE VII

| # Foundries |            | <u>Savings (\$000)</u> |            |                        |            | Overall Savings<br>Per Visit |            |
|-------------|------------|------------------------|------------|------------------------|------------|------------------------------|------------|
|             |            | <u>Realized</u>        |            | <u>Next Five Years</u> |            |                              |            |
| <u>CAN</u>  | <u>ORF</u> | <u>CAN</u>             | <u>ORF</u> | <u>CAN</u>             | <u>ORF</u> | <u>CAN</u>                   | <u>ORF</u> |
| 13          | 9          | 426                    | 11         | 2841                   | 305        | 251                          | 34         |

CANMET savings amounted to \$251 thousand per visit compared with \$34 thousand per visit from ORF. It should be noted that all of the foundries in Ontario had been visited only a few weeks or months before the evaluation so the estimated savings from the ORF visits would have been higher if the foundries had had more time to analyse and implement the recommendations. The unusually high number of recommendations still being considered, (22.5% in the metal category and 15.5% in the sand category) shown in TABLE V above, suggests that further savings would likely be realized when the foundries have had time to decide upon all of the recommendations.

### 1.7.4 OTHER BENEFITS

Some of the secondary benefits resulting from the CANMET and ORF programs, as of the time of the respective evaluations, are listed below:

- The ORF visits resulted in the hiring of two additional professional staff while the CANMET visit resulted in the hiring of five technical people.
- The ORF group had arranged for training for nine employees while training for 11 people was arranged by the CANMET sample of firms.
- Four companies had purchased new equipment as a result of the ORF visits compared to seven companies making purchases based on CANMET recommendation.

In neither instance was there great expectations that new products, sales or jobs would result from the visits but firms generally felt they would result in higher quality, more competitive products.

#### 1.7.5 OVERALL IMPRESSIONS

A comparison of the firms ratings of the overall usefulness of the CANMET and ORF visits and reports is given in TABLE VII below.

TABLE VII

|                  | <u>CANMET</u> | <u>ORF</u> |
|------------------|---------------|------------|
| Not useful       | -             | 2          |
| Somewhat Useful  | -             | 1          |
| Useful           | 2             | 4          |
| Very Useful      | 7             | 1          |
| Extremely Useful | 4             | 1          |

Again, it will be observed that the CANMET service was better received, in general, than the ORF service, especially in the field of metal preparation and quality control.

QUEBEC1.1 CHARACTERISTICS OF COMPANIES

Ten foundries were interviewed in Quebec, the smallest of which employed 14 persons, the largest 105. TABLE I below summarizes their size characteristics by total number of employees, number of professional and technically trained personnel and the number employed in the quality control work.

TABLE I

| <u>Size Categories<br/>(# Employees)</u> | <u># Foundries</u> | <u>Professional<br/>&amp; Technical<br/>Employees</u> | <u>Employees<br/>in Quality<br/>Control</u> |
|------------------------------------------|--------------------|-------------------------------------------------------|---------------------------------------------|
| 10 - 19                                  | 2                  | 0, 3                                                  | 0, 2                                        |
| 20 - 49                                  | 5                  | 5, 3, 4, 1, 2                                         | 2, 3, 3, 1, 2                               |
| 50 - 74                                  | 1                  | 7                                                     | 3                                           |
| 75 - 99                                  | 1                  | 2                                                     | 2                                           |
| 100 - 149                                | <u>1</u>           | <u>7</u>                                              | <u>4</u>                                    |
| Total                                    | 10                 | 35                                                    | 22                                          |

Annual sales ranged from \$850 thousand to \$9 million. Six firms reported export sales amounting to \$4.619 million or 14% of their total of \$33 million.

1.2 IMPLEMENTATION OF RECOMMENDATIONS

Specific recommendations to improve productivity were made in the CRIQ reports in the metal processing and sand treatment areas of foundry operations. TABLE II below summarizes the action taken on these recommendations by the Quebec foundries.

TABLE II

|                         |    | # Recs   | Fully or<br>Partially<br>Implemented | Planned   | Disagreed<br>With | Being<br>Considered | Too<br>Costly |
|-------------------------|----|----------|--------------------------------------|-----------|-------------------|---------------------|---------------|
| <u>Metal Processing</u> |    |          |                                      |           |                   |                     |               |
| Company                 | 1  | 5        | 3                                    | 2         | -                 | -                   | -             |
|                         | 2  | 3        | 3                                    | -         | -                 | -                   | -             |
|                         | 3  | 5        | 5                                    | -         | -                 | -                   | -             |
|                         | 4  | 7        | 7                                    | -         | -                 | -                   | -             |
|                         | 5  | 15       | 10                                   | 5         | -                 | -                   | -             |
|                         | 6  | 7        | 6                                    | -         | 1                 | -                   | -             |
|                         | 7  | 5        | 4                                    | -         | 1                 | -                   | -             |
|                         | 8  | 4        | 2                                    | 2         | -                 | -                   | -             |
|                         | 9  | 16       | -                                    | -         | 16                | -                   | -             |
|                         | 10 | <u>5</u> | <u>3</u>                             | <u>2</u>  | <u>-</u>          | <u>-</u>            | <u>-</u>      |
| Total                   |    | 72       | 43(59.7%)                            | 11(15.3%) | 18(25%)           | -                   | -             |
| <u>Sand</u>             |    |          |                                      |           |                   |                     |               |
| Company                 | 1  | 5        | 3                                    | 2         | -                 | -                   | -             |
|                         | 2  | 3        | 3                                    | -         | -                 | -                   | -             |
|                         | 3  | 3        | 2                                    | 1         | -                 | -                   | -             |
|                         | 4  | 7        | 7                                    | -         | -                 | -                   | -             |
|                         | 5  | 8        | -                                    | 8         | -                 | -                   | -             |
|                         | 6  | 5        | 1                                    | 3         | -                 | -                   | 1             |
|                         | 7  | 2        | 2                                    | -         | -                 | -                   | -             |
|                         | 8  | 5        | 4                                    | -         | 1                 | -                   | -             |
|                         | 9  | 6        | -                                    | -         | 6                 | -                   | -             |
|                         | 10 | <u>5</u> | <u>3</u>                             | <u>1</u>  | <u>-</u>          | <u>1</u>            | <u>-</u>      |
| Total                   |    | 49       | 25(51%)                              | 15(31%)   | 7(14%)            | 1(2%)               | 1(2%)         |

In the metal processing category 75% of the recommendations were either implemented or planned while 82% of the sand recommendations had been adopted or planned. One firm which claimed the recommendations were not appropriate for the size of the foundry, rejected all of the recommendations in both the metal and sand categories which distorts the overall results in a negative direction.

### 1.3 TECHNOLOGICAL BENEFITS

The foundries assessed the technological level of usefulness of the MFL visit under four technical categories. They rated usefulness on a 1 to 5 scale with 1 representing the low level and 5 a high level. The results are shown in TABLE III below.

TABLE III

| Technical Categories                | New Knowledge Concepts or Ideas |     | Assistance in Technical Problems |     | Recs to Improve Processing |     | Overall Average |
|-------------------------------------|---------------------------------|-----|----------------------------------|-----|----------------------------|-----|-----------------|
|                                     | <u>Range-Average</u>            |     | <u>Range-Average</u>             |     | <u>Range-Average</u>       |     |                 |
| Moulding Methods & Sand Control     | 1 - 4                           | 2.4 | 1 - 5                            | 2.9 | 1 - 5                      | 3   | 2.8             |
| Metal Preparation & Quality Control | 1 - 4                           | 2.3 | 1 - 4                            | 2.4 | 1 - 5                      | 2.9 | 2.5             |
| Defect Analysis*                    | 3 - 4                           | 3.2 | 3 - 4                            | 3.5 | 3 - 5                      | 3.8 | 3.5             |

\* Five firms could not rate defect analysis. None of the ten foundries visited were using computers in process control but eight stated that they intended to install them.

### 1.4 ECONOMIC AND OTHER BENEFITS

#### 1.4.1 ECONOMIC BENEFITS

The companies estimated the actual savings realized to date and the savings expected over the next five years which were attributed to the MFL visit. TABLE IV below summarizes their estimates.

TABLE IV

| <u>Categories</u>       | <u>Estimated Savings (\$000)</u> |                     | <u>Total</u> |
|-------------------------|----------------------------------|---------------------|--------------|
|                         | <u>Actual</u>                    | <u>Next 5 Years</u> |              |
| Metal Processing        | 58                               | 263                 | 321          |
| Sand                    | 13                               | 115                 | 128          |
| Cleaning Room Practices | -                                | -                   | -            |
| Total                   | 71                               | 378                 | 449          |

Three companies were unable to quantify savings in monetary terms in the sand category but admitted that the recommendations on sand usage reduced considerably the number of rejects, and one company identified reductions in personnel as a result of improvements in cleaning room practices.

#### 1.4.2 ANALYSIS

Nine of the ten foundries interviewed in Quebec employed professional or technical staff. Six of these were smaller companies with fewer than 50 employees, and three had 50 or more employees. Two of the larger firms and five of the smaller firms estimated that they had saved or expected to save \$449 thousand over a six year period. This amounts to an average of \$45 thousand per firm per visit for the ten firms visited.

#### 1.4.3 OTHER BENEFITS

Two foundries hired a total of three technical personnel, seven firms intended to arrange for technical training for 51 people and six firms had purchased or intended to purchase equipment as a result of the MFL visit. Nine attributed improved quality to their products and four claimed increased sales as a result of the MFL visit, but could not quantify them in monetary terms.

#### 1.5 OVERALL IMPRESSIONS

The companies rated the overall usefulness of the visit on a scale ranging from "not useful" to "extremely useful". The results are shown in TABLE V below.

TABLE V

|                  |   |
|------------------|---|
| Not Useful       | 0 |
| Somewhat Useful  | 0 |
| Useful           | 4 |
| Very useful      | 2 |
| Extremely Useful | 4 |

One firm claimed that the MFL visit was only somewhat useful in the metal processing category but extremely useful in the sand category.

#### 1.6 SUGGESTIONS

The foundries were asked for suggestions to improve the program. The following comments and suggestions were offered:

- We were aware of shortcomings before the MFL visit. The visit confirmed our analysis.
- The MFL visits should be of 3 to 5 days duration.
- The MFL visits should occur every one to two years.
- The CRIQ takes too long to issue its report. Some personnel of the MFL do not have practical foundry experience.
- The MFL should visit at foundrys' requests and they would pay the cost.

#### REGIONALIZATION AND USER FEES

Only three of the ten firms visited were in favour of regionalization. Most of the others thought that centralising would give a better picture of foundry operations throughout Canada.

#### FEES

All firms agreed in principle with the payment of fees. Two firms agreed with a fee of \$1000, one firm stated that the visit should be at the foundry's request and that it pay the actual cost of the visit, and one firm was willing to pay \$2000 per visit.

#### 1.7 COMPARISON OF CANMET AND CRIQ/MFL SERVICE

##### 1.7.1 IMPLEMENTATION OF RECOMMENDATIONS

TABLE VI below, compares the degree of implementation by firms of all of the recommendations contained in the reports provided by

CANMET and CRIQ after their visits to Quebec firms in 1984/85 and 1986 respectively.

TABLE VI

|                         | Total No.<br>of Recs | Fully or<br>Partially<br>Implemented | Planned | Being<br>Considered | Disagreed<br>With | Too<br>Costly |
|-------------------------|----------------------|--------------------------------------|---------|---------------------|-------------------|---------------|
| <u>Metal Processing</u> |                      |                                      |         |                     |                   |               |
| CANMET (9 Co.s)         | 73                   | 39(53%)                              | 4(6%)   | 11(15%)             | 18(25%)           | 1(1%)         |
| CRIQ (10 Co.s)          | 72                   | 43(60%)                              | 11(15%) | 0                   | 18(25%)           | 0             |
| <u>Sand Treatment</u>   |                      |                                      |         |                     |                   |               |
| CANMET (9 Co.s)         | 58                   | 31(53%)                              | 4(6%)   | 6(11%)              | 17(29%)           | 0             |
| CRIQ (10 Co.s)          | 49                   | 25(51%)                              | 15(31%) | 1(2%)               | 7(14%)            | 1(2%)         |

It will be noted that the percentages of CRIQ's recommendations which were implemented or planned, that is 75% for metal processing and 82% for sand treatment, were significantly greater than the 59 % in both categories for the CANMET recommendations. In addition, fewer of the CRIQ sand treatment recommendations were disagreed with. It should be noted that the value of the CANMET visits was impaired in one or two instances by the absence of key company personnel.

#### 1.7.2 TECHNOLOGICAL BENEFITS

TABLE VII below provides a comparison of the overall average ratings by firms of the technological usefulness of the MFL service based on individual ratings of usefulness in the three areas of transfer of new knowledge, assistance with technical problems and recommendations to improve processes for CANMET and CRIQ.

TABLE VII

| <u>Technical Categories</u>      | <u>CANMET</u> | <u>CRIQ</u> |
|----------------------------------|---------------|-------------|
| Moulding Methods & Sand Control  | 3.0           | 2.8         |
| Metal Preparation & Sand Control | 2.4           | 2.5         |

Again, there was insufficient data obtained in the current evaluation to make a valid comparison possible in the areas of Defect Analysis and Computer Control. It is clear, however, that in the Moulding Methods and Metal Preparation categories, the technical benefits arising from the CRIQ visits were seen to be equal to those generated by the CANMET MFL service.

### 1.7.3 ECONOMIC BENEFITS

During the evaluation of the CANMET service, the data obtained showed total average savings of \$82 thousand per firm might be expected over a period of 6 years. Comparable figures for the CRIQ service are \$45 thousand per firm.

### 1.7.4 OTHER BENEFITS

Some of the secondary benefits resulting from the CANMET and CRIQ programs, as of the time of the respective evaluations, are listed below:

- Both the CANMET and CRIQ groups of companies had hired three additional technical staff.
- The CANMET group had arranged for training for 15 people while the corresponding figure for the CRIQ group was 51, a significant increase.
- Three of the CANMET firms had purchased new equipment as a result of the visit, while six of the CRIQ clients had made, or intended to make, such purchases.
- In terms of improved quality, ability to make new products and increased sales, the responses of firms in the CANMET group and of those in the CRIQ group were basically similar.

### 1.7.5 OVERALL IMPRESSIONS

A comparison of the firms ratings of the overall usefulness of the CANMET and CRIQ services is given in TABLE VIII below.

TABLE VIII

|                  | <u>CANMET</u> | <u>CRIQ</u> |
|------------------|---------------|-------------|
| Not Useful       | -             | -           |
| Somewhat Useful  | -             | 1*          |
| Useful           | 2             | 4           |
| Very Useful      | 6             | 2           |
| Extremely Useful | 1             | 4           |

Again, it appears that firms in the CANMET and CRIQ groups found the service to be, in general, very useful in both cases.

\* One firm rated the metal category as somewhat useful and the sand category as extremely useful, therefore the total is 11 not 10.

LIST OF FOUNDRIES INTERVIEWED

| <u>FOUNDRY</u>                                                                                                                                                                                                | <u>LOCATION</u>                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <u>ONTARIO</u>                                                                                                                                                                                                |                                |
| Meteor Foundry Co, Ltd.                                                                                                                                                                                       | Mississauga                    |
| Saltfleet Aluminum Foundry                                                                                                                                                                                    | Hamilton                       |
| Bibby Ste-Croix Foundry Ltd.                                                                                                                                                                                  | Cambridge                      |
| Fahramet Ltd.                                                                                                                                                                                                 | Orillia                        |
| Deloro Stellite Ltd.                                                                                                                                                                                          | Belleville                     |
| CAE Diecast Ltd.                                                                                                                                                                                              | St. Catherines                 |
| Norcast Inc.-Wabi Iron Works                                                                                                                                                                                  | New Liskeard                   |
| Burnstein Castings Ltd.                                                                                                                                                                                       | St. Catherines                 |
| Findlay Foundry Ltd.                                                                                                                                                                                          | Carlton Place                  |
| Note: While ten foundries had been visited by ORF/MFL, it was not possible for the consultants to find a knowledgeable person at one foundry due to staff changes, and so only nine foundries were evaluated. |                                |
| <u>QUEBEC</u>                                                                                                                                                                                                 |                                |
| La Fonderie IVI Inc.                                                                                                                                                                                          | Valcartier                     |
| La Fonderie Laforo Inc.                                                                                                                                                                                       | Sainte-Claire,<br>Dorchester   |
| La Fonderie de Thetford(1969) Inc.                                                                                                                                                                            | Thetford Mines                 |
| Metallurgie Frontenac Ltee                                                                                                                                                                                    | Thetford Mines                 |
| Fonderie Forano Inc.                                                                                                                                                                                          | Plessisville                   |
| Fonderie Grand-Mere Ltee.                                                                                                                                                                                     | Grand-Mere                     |
| Fonderie Laperle (1985) Inc.                                                                                                                                                                                  | Saint-Ours                     |
| Fonderie Nova Inc.                                                                                                                                                                                            | Saint-Hyacinthe                |
| Fonderie Pole-Lite Ltee.                                                                                                                                                                                      | Saint-Philippe<br>de Laprairie |
| Fonderie Cormier Inc.                                                                                                                                                                                         | Saint Thomas-Joliette          |